

COMModitizing the Airspace

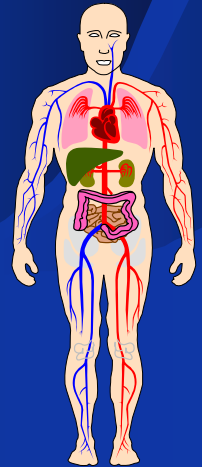


**FLIGHT
OPERATIONS
TECHNOLOGY**
Innovations in flight

Captain David Witchey
Flight Technical Pilot

Goals

- Suggest a different glance at potential futures
- Provide an appreciation of how critical Comm is
- Plant the seeds for



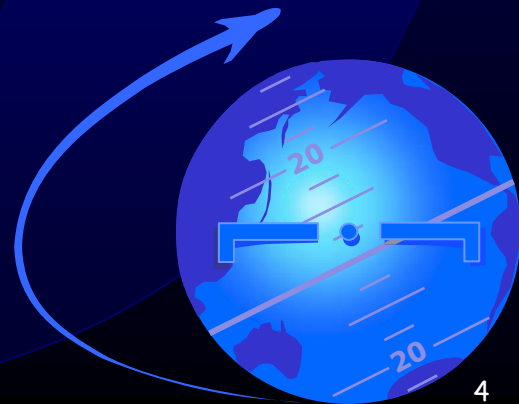
Overview

- Implications of interconnections
- The “commoditization” of constraints
- A “Flight Contract”
- Conclusions and Recommendations



Topics

- Implications of interconnections
- The “commoditization” of constraints
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Our society...

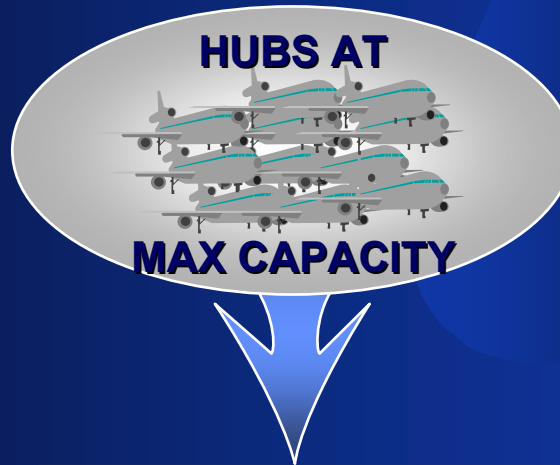
- Even more interconnected
- Your checking account
- Your phone bill
- Planet-wide travel alliances



Basic forces at work...



- RTA Assignments
- Service Paradigm
- Passenger Level of Connectivity
- Costs...



- Capacity Initiatives
- Collaboration & CDM Extensions
- A/C & Hub Evolution
- Majors:RJ:Frac:SATS



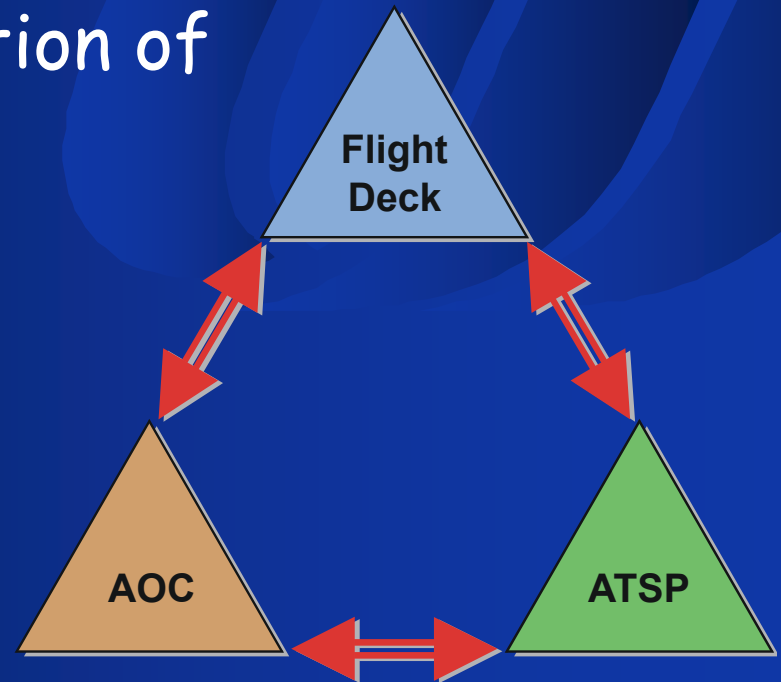
- Developing Air Commerce Web
- Service Cost and Benefit Tracking
- Planetwide Alliances & Virtual Companies

MORE
People Comm Aircraft



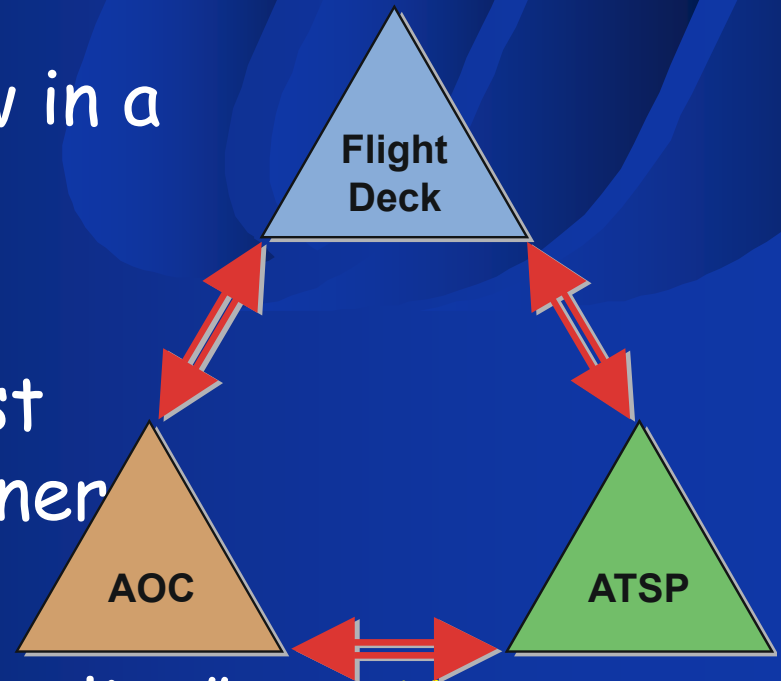
Look at basic DAG-TM...

- Excellent Characterization of Free Flight Growth
- Three Constituents
 - 14 "Concept Elements"
- Each Arrow Represents Communications



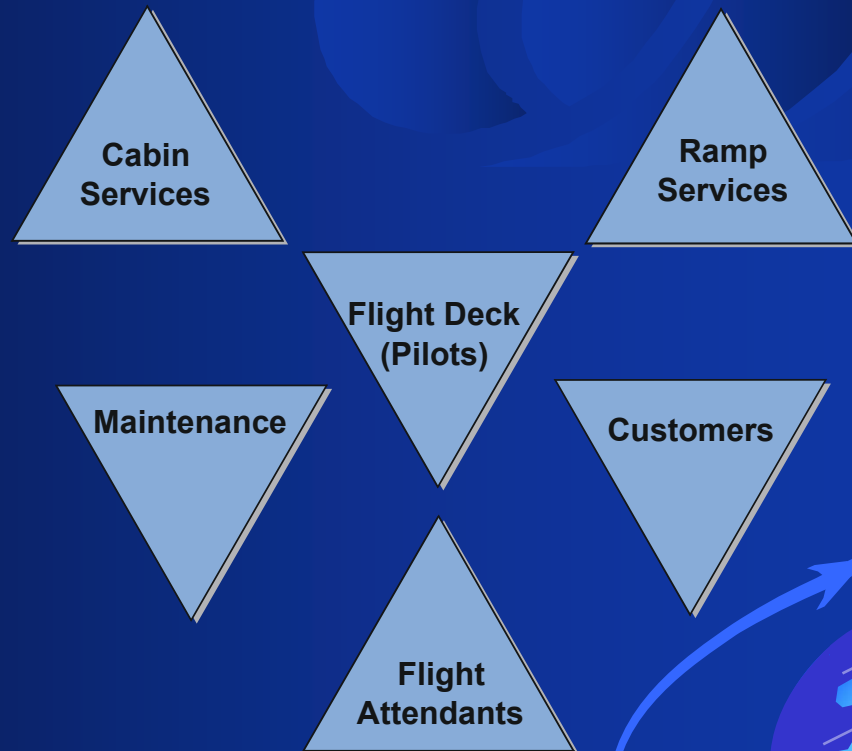
Observations

- Constituents Must Grow in a Balanced Manner
- Comm Among Them Must Grow in a Balanced Manner
- Constituents Will "Generalize" as Air Commerce Matures



DAG-TM “Generalizes”...

- The Flight Deck, for instance...

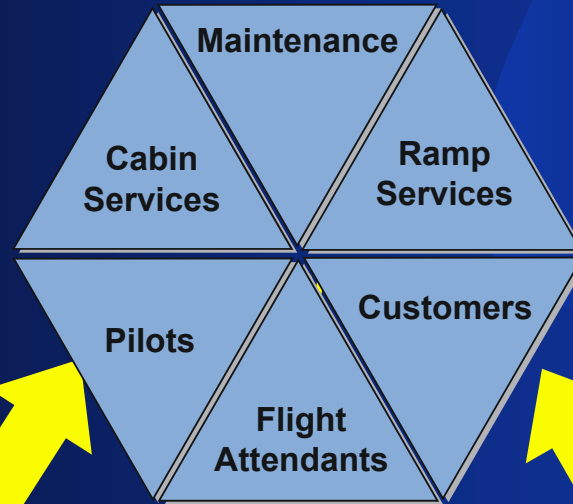


- Becomes **THE AIRPLANE...**



DAG-TM “Generalized”

- Each Constituent Becomes an Integrated Team*



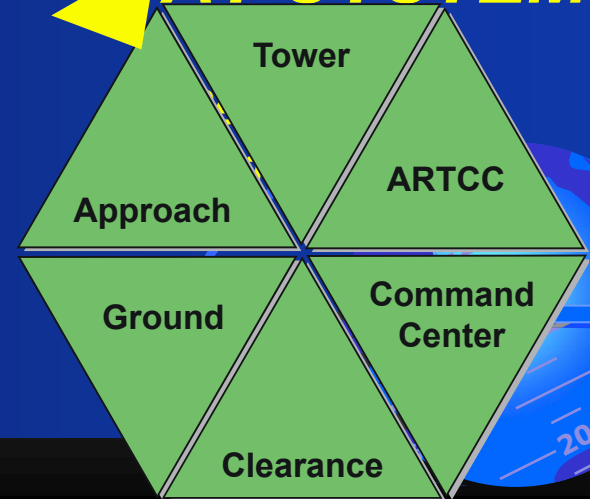
AIRCRAFT

AIRLINE



* These are just a few representative team members -- NOT an exhaustive list.

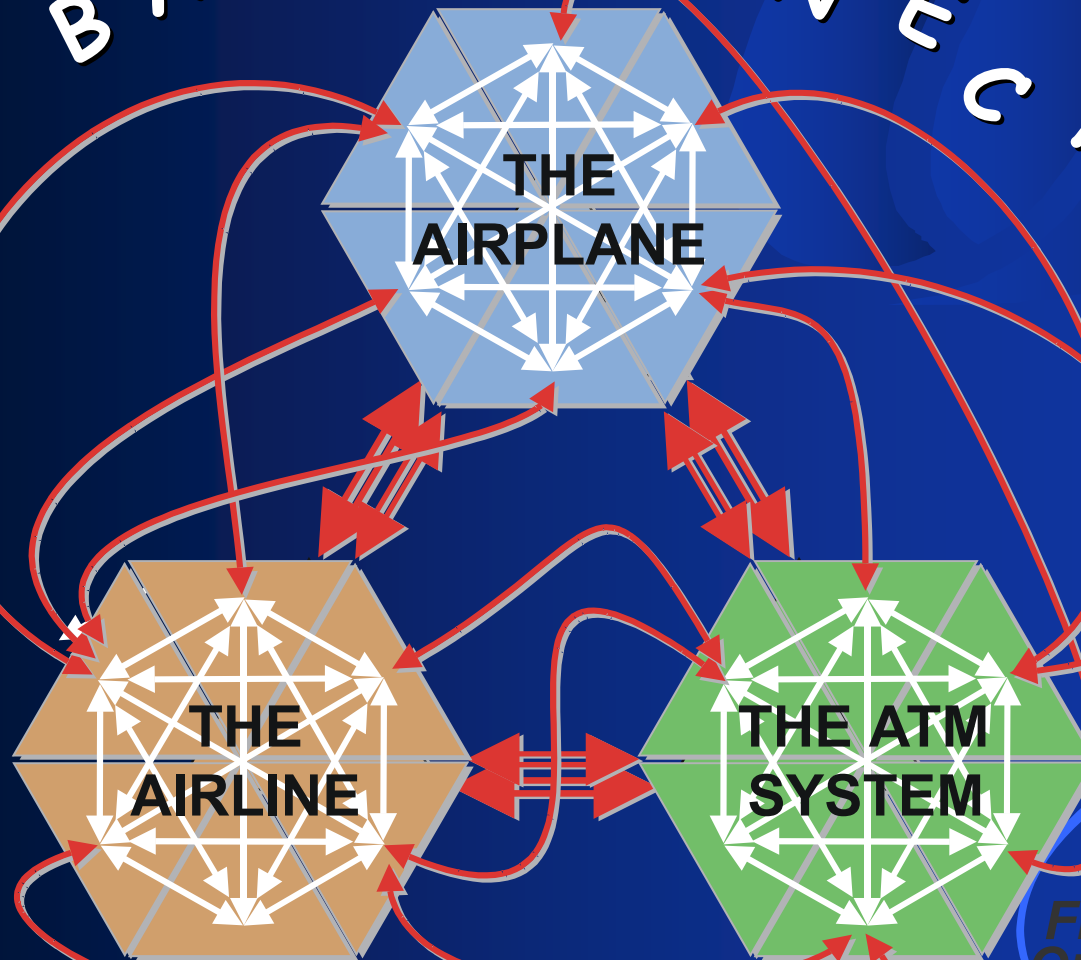
AT SYSTEM



COMM **Airspace**

Comm results...

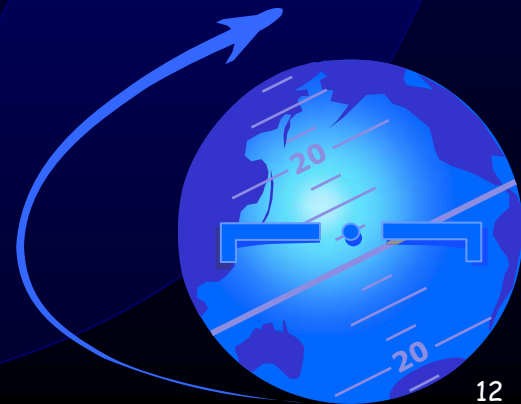
BROAD BAND CONNECTIONS



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A market economy...

- Law of supply and demand
- Example constraints
 - Prime time slots
 - RTAs
 - Frequency occupancy
 - Gate occupancy
 - Runway loading
 - Environmental loading



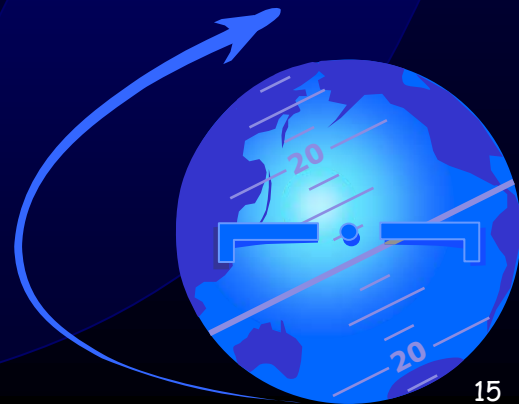
“Constraints” have tangible value

- Stock options...
- Emission allowances...
- Landing slots...
- “Constraints” dictate evolution, and become **COMMODITIES** in a market economy (performance-based ATC)



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A “Flight Plan”

- Provides a Comm out plan
- Helps with Search and Rescue...
- Is this what we need in the future?
- We'll want (sign up for?) basic services...
 - Equipage levels?
 - Service levels?
 - System contribution levels?
 - System stress levels?



How can I support the dynamic management of...

- RTAs?
- Bandwidth use?
- Emission allowances?
- Runway/taxiway/gate occupancy
- Noise budgets?
- Airspace infrastructure contribution?
 - ADS-B
 - Weather downlinks
 - Airborne message routing



Answer?

- Generalize the "Flight Plan"
- Create a "Flight Contract"
- Deviate from there...
- DYNAMICALLY manage the "contract"..
The COMMODITIES



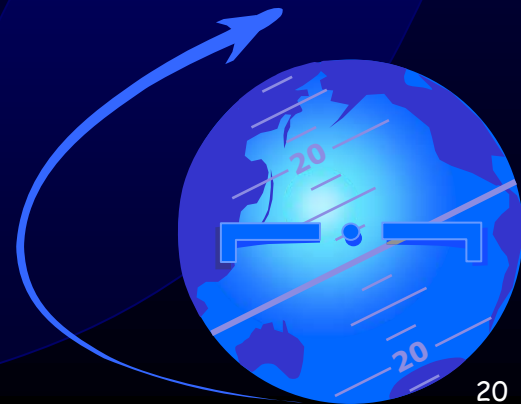
Look at RTAs

- Need high, efficient, safe throughput at major hubs
- RTAs are far too valuable to waste
- I need a way to dynamically manage them
- A free market exchange?
- A tightly regulated process/group?
- Something in between?



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Goals

- Suggest a different glance at potential futures
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Conclusions

- Managing Constraints is Critical
- Collaboration is Key
- Comm is King... (not just hard/software), but
- Over-assumed and Under-funded
- COMModitization ~ just around the corner...
- Comm is the Weakest Link...

Goodbye

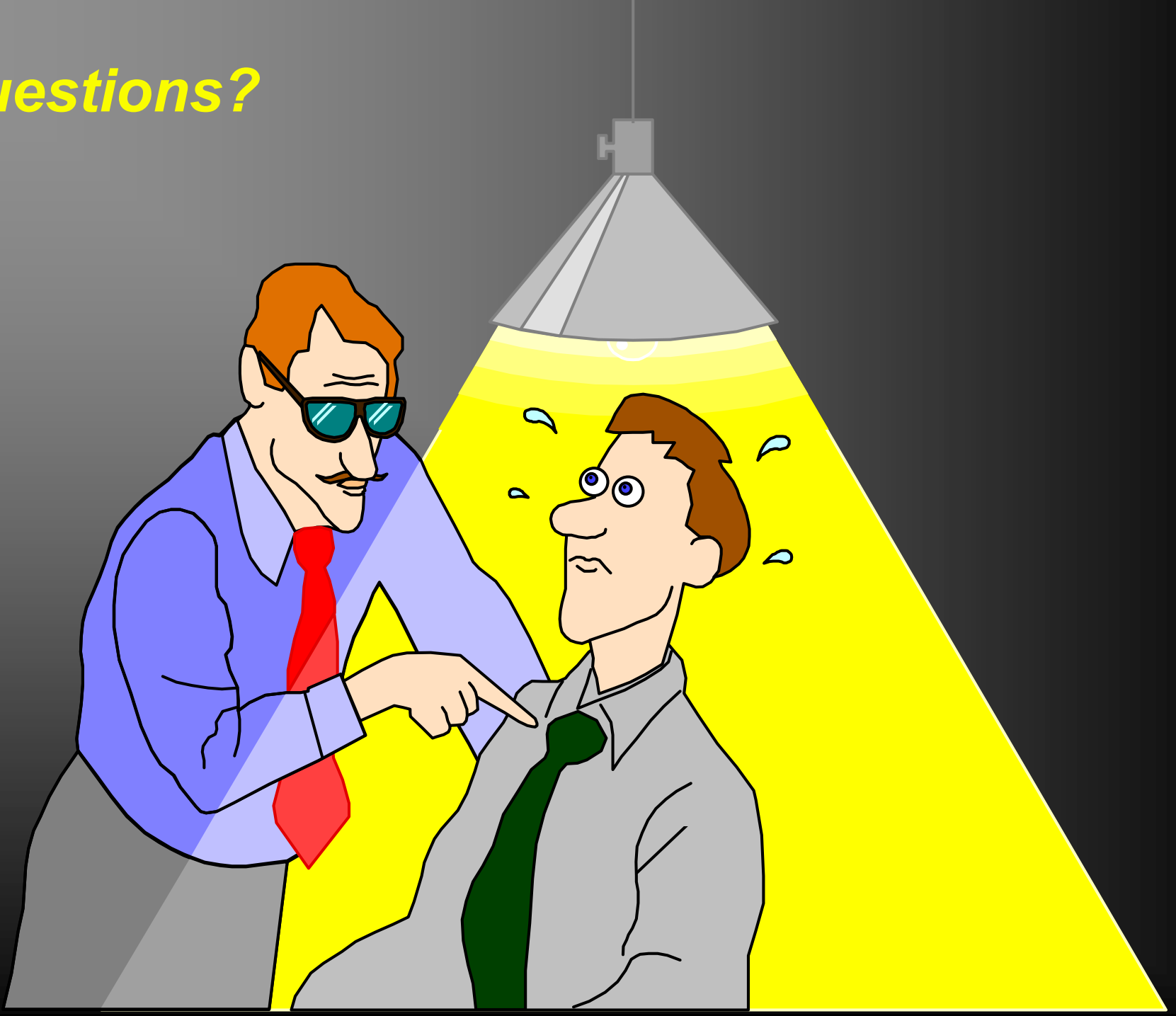


Recommendations

- View the spaghetti as an opportunity -- urge your organizations to seize it, mold it, and use it.
- Don't ASS U ME Comm, or U & ME will never make Free Flight Fly.
- NASA! FAA! EUROPE! Fix the certification process...
- Accelerate, coordinate, and integrate efforts:
 - Broadband IFE/AAC/AOC integration, A/C networks & servers, IP integration, Comm liability issues, ADS-B STRATEGIC efforts, TIS-B/ADS-B integration, FIS-B importance and standards, RTA assignments, environmental constraints, dynamic managing of real-time constraints, etc.



Questions?





FLIGHT OPERATIONS TECHNOLOGY

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